

HOUSEHOLD **HAZARDOUS** MATERIALS EDUCATION SUPPORT PROGRAM



**SAFE, SMART,
SOLUTIONS FOR IOWA**

PURPOSE

This is designed to teach students about the presence of household hazardous materials (HHMs) and offer some concept of the dangers the materials present to people and the environment. Even the youngest students should come away with an understanding that improper use, storage and disposal of some common products found around the house could be bad for their health — even fatal. The content can be adapted to any classroom schedule to fit instructor preferences. The instructor should allow five to ten half-hour classroom periods to cover all of the content.

I. Classroom Introduction

- A. EPA: Americans generate 1.6 million tons of household hazardous materials per year. That's what 250,000 elephants together weigh!
- B. The average home has about 100 pounds of HHM — about the same weight as a small grown-up.
- C. Improper use/disposal can put HHMs right into the sources for our drinking water.
- D. Improper use/disposal can put HHMs into rivers and lakes where we also fish and swim and get some of our drinking water.

II. Classroom Session #1 – Identifying Household Hazardous Materials

- A. What Makes Products Hazardous? (*University of Texas*)
 - 1. It can catch fire easily.
 - 2. It can explode.
 - 3. Corrosive, which means it can dissolve things.
 - 4. Toxic, which means it's poisonous.

B. Hazardous Materials Around the House

1. Paints (Toxic)
2. Cleaning Sprays for the Kitchen and Bathroom (Corrosive/Toxic)
3. Furniture Polish (Toxic)
4. Car products
 - a. Oil (Toxic)
 - b. Gas (Toxic/Flammable)
 - c. Car Batteries (Corrosive)
 - d. Car Wax/Detergents (Toxic)
 - e. Other Fluids (Antifreeze, Windshield Wiper Fluid, Brake Fluid, Transmission Fluid) (Toxic)
5. Bug and Weed Killers (Toxic)
6. Other Chemicals, such as...
 - a. Shoe Polish (Toxic)
 - b. Pool Chemicals (Toxic)
 - c. Arts and Crafts Materials (Toxic)
 - d. Nail Polish Remover (Toxic)

C. Exercise – Distribute the checklist of common household hazardous materials provided, and have students sit down with their parents and check off how many are kept in the house. Remind the students not to touch the materials.

III. Classroom Session #2 – Experiment: The Dilution Solution (*source: EPA*)

- A. Objective – To show that dilution is not a good solution to surface water pollution.
- B. Materials – 1 empty aquarium or other large clear container; two 500-ml beakers or glass jars; tap water; red food color.
- C. Background – The water in lakes and oceans is refilled over time fed through rivers, rainfall, etc. The amount of time (“retention time”) varies with the body of water. Lake Erie has a retention time of nine years. For Lake Superior, it’s 200 years. Does that mean that when it rains enough and a river pours enough water that the pollution in a lake is washed away?
- D. Procedure – Fill a beaker or jar with tap water and stir in a few drops of food color, turning the water bright red. The red represents pollution in a lake. Try one complete renewal of the water by filling the second beaker with clear tap water. With a student holding the “lake” with red water over an aquarium, pour this new water into the “lake.” The water will mix and overflow into the aquarium. Observe that while all the water has been “replaced,” the pollutant is still visible.

Repeat several times until the “lake” water is again clear. It takes a lot of rain and fresh water to make the pollution in the “lake” disappear. But what happened to the pollution? Look in the aquarium. Note that it’s red – the pollution didn’t disappear; it merely moved to another water source.

IV. Classroom Session #3 - How Household Hazardous Materials Contaminate Groundwater

A. The difference between groundwater and surface water

1. Surface water: lakes, rivers, streams, and ponds.
2. Groundwater is contained in “aquifers” – sand and gravel far underground that is soaked with water.
3. Most Iowans get their drinking water from underground streams.
(According to the IDNR, 78.8% of Iowans get their drinking water from groundwater.)
4. Groundwater feeds lakes and streams; anything harmful in them affects fish and plants.

B. What happens to...

1. hazardous materials that are poured down the drain?
2. hazardous materials poured on the ground?
3. hazardous materials thrown in the garbage?

C. Additional Research – Ask children to find out from their parents where the water in their house comes from and goes. Does anyone in the class rely on well water? How many have septic tanks and how many are connected to a city sewer. Discuss the difference.

D. Exercise

Aquifer Sundae (www.groundwater.org)

Objective – To demonstrate for students about geological formations in an aquifer and how contaminants can enter the water system and filter down into the water table.

Materials – Blue or red food coloring; vanilla ice cream; clear soda pop; crushed ice; variety of colored sprinkles and sugars; drinking straws; clear plastic cups.

Procedure – The instructor should demonstrate by filling a clear plastic cup 1/3 full with crushed ice (representing underground gravel and soil). To represent the water in the aquifer, add just enough soda to cover the ice. Add a layer of ice cream to serve as the geologic “confining layer” that lies above the aquifer. Then add more crushed ice to represent upper soil. Cover top with colored sugars and sprinkles to represent topsoil, creating a porous surface. Add food coloring to the soda and pour it on top of the “aquifer.” Observe what happens when the “contamination” is added to the environment. Then using a straw, “drill” a well by sucking on the straw – watch how the water table lowers and how contamination gets sucked into the well area and ultimately reaches the groundwater. Recharge the aquifer by adding more rainfall (soda).

While the aquifer can then be eaten, care should be taken to avoid the message that “contaminated water” can be safely consumed. It’s recommended that only the teacher do the activity as a demonstration, making a point of discarding the “contaminated” and spoiled aquifer. The students may then be encouraged to share the leftover ingredients.

V. Classroom Session #4 – Proper Handling & Disposal of Household Hazardous Materials

A. General Rules

1. Keep HHM containers dry and away from extreme heat and cold.
2. Keep where children and pets cannot reach them.
3. Buy only what you need, and use what you buy.
4. What you can't use, try to give to someone who can (It is illegal to sell or give away any pesticide that has been opened or if the original product label is missing or cannot be clearly read).
5. NEVER pour waste fluids into storm drains, sewers, on the ground, or in the garbage without being sure that it's safe.

B. Waste Management Assistance

1. Central Office – Mission Statement: “To educate and assist Iowans to protect, conserve and enhance natural resources and the environment for all generations through the sustainable practices of pollution prevention and responsible waste management.”
2. Regional Collection Centers – These are permanent, year-round sites for collection of household hazardous materials now serving many Iowa counties. All operate with funding and technical assistance from the Waste Management Assistance staff. The department's goal is to have one regional collection center available for each Iowa county.

C. Buy Smart

1. Only Buy What You Need
2. Buy Better Products
For example, buy latex instead of oil-based paint
 - a. Use traps rather than poison for mice and other pests (makes little difference to the mouse).

VI. Classroom Session #5 – Safer Choices

A. Safer Choices for PARENTS (teachers might try showing samples where possible)

1. Instead of **ant spray**, use chili powder.
2. Instead of **mothballs**, try cedar chips or newspapers.
3. Instead of **bathroom cleaners**, try a baking soda and water mixture.
4. Instead of **carpet cleaner**, try just sprinkling baking soda on carpet.
5. Instead of **air freshener**, use an open box of baking soda in refrigerators, closets, and bathrooms.

B. Exercise

Baking Soda as a safe alternative

Objective – To demonstrate how common baking soda can be an effective odor-killer, and is much safer for our water supply than room “air fresheners.”

Materials – Several clean small wide-mouth jars with lids (such as baby food jars), liquid odor sources (possibilities include vinegar, lemon juice, pickle juice, vanilla extract, sauerkraut juice, and water from canned tuna), cotton balls, one box of baking soda.

Procedure – In each of several small wide-mouth jars with lids, put a cotton ball, followed by two to three drops of an odor source). Close the jar and shake it several times, then let it sit for at least 2 minutes. Open jars and have students smell the odor and describe it. Then place a teaspoon of baking soda into each jar along with the cotton ball. Close jar again and shake several times, again letting it sit for 2 minutes, but with the lid loosely on (allowing gas to escape and preventing pressure build-up). Open the jar and compare the odor to the original. Since many odors are caused by acids, and baking soda neutralizes acids through chemical reaction (releasing carbon dioxide in the process), new substances are formed that have different or less obvious odors. Some odors are not caused by acids; they will not be as affected by the baking soda.

HOUSEHOLD HAZARDOUS MATERIALS QUIZ

Name: _____

1. What does “Hazardous” mean?
 - a. It can make you sick.
 - b. It can burn you.
 - c. It can explode.
 - d. All of these.

2. Does every house have Household Hazardous Materials in it?

3. Where does most of Iowa’s drinking water come from?
 - a. The Mississippi River
 - b. The Cedar River
 - c. The oceans
 - d. Water buried deep underground in the earth

4. Why shouldn’t we just throw hazardous materials away or pour them on the ground?

5. What’s the best way to handle hazardous materials?
 - a. Don’t buy them in the first place.
 - b. Don’t buy more than you can use.
 - c. Store them where they are out of reach of children and pets.
 - d. All of these.

HOUSEHOLD HAZARDOUS MATERIALS WORKSHEET

Name: _____

HOW MANY CAN YOU FIND IN YOUR HOUSE?

Directions: Parents, please review this list with your child, crossing off each HHM stored inside your home. Talk to your child about how you store these materials and how they are safely stored.

CAR PRODUCTS

Antifreeze
Batteries (lead acid)
Brake Fluid
Carburetor Cleaner
Car Wax
Engine Degreaser
Gasoline
Motor Oil
Transmission Fluid
Windshield Wiper Fluid

YARD SUPPLIES

Fertilizer
Insecticide
Weed Killer

HOUSEHOLD SUPPLIES

Aerosols
Air Freshener
Glue
Hair Color
Hair Spray
Nail Polish
Nail Polish Remover

CLEANERS

All-Purpose Cleaner
Ammonia
Bathroom Cleaner
Bleach
Carpet Cleaner
Disinfectant
Drain Cleaner
Floor Cleaner
Furniture Polish
Metal Polishes
Oven Cleaner
Paint Thinner
Scouring Powder
Spot Remover
Window/Glass Cleaner

MISCELLANEOUS

Asphalt/Roofing Tar
Batteries (NiCad-Rechargeable)
Batteries (DryCell – button)
Flea Sprays/Collars
Kerosene
Lighter Fluid
Mothballs
Paint (oil-based)
Photography Chemicals
Pool Chemicals
Rodent Killer

Others?



**SAFE, SMART,
SOLUTIONS FOR IOWA**

**Call 515-281-4367 for more information or log-on at
www.safesmartolutions.org**

Iowa Department of Natural Resources
Wallace State Office Building Des Moines, IA 50319-0034